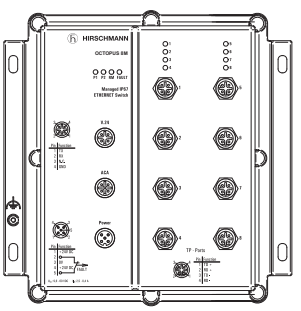
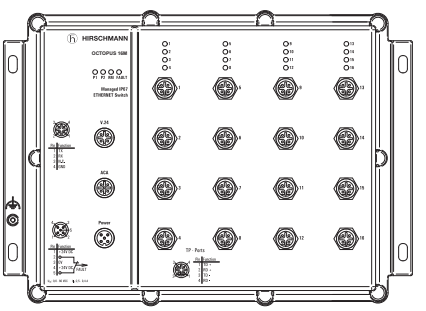
HIRSCHMANN
A BELDEN BRAND

User Manual

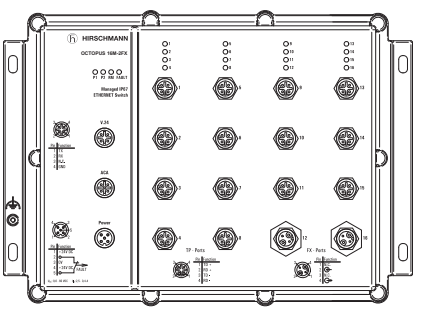
Installation
IP67 Switch
OCTOPUS 8M..., OCTOPUS 16M..., OCTOPUS 24M...



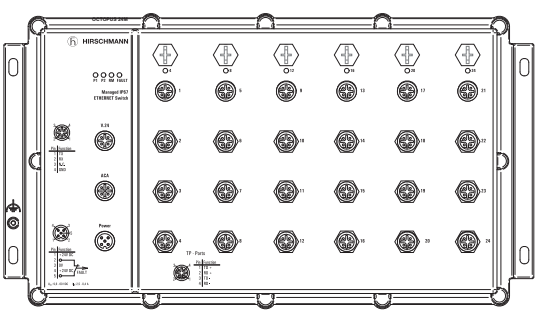
OCTOPUS 8M
OCTOPUS 8M Train
OCTOPUS 8M-8PoE
OCTOPUS 8M-6PoE



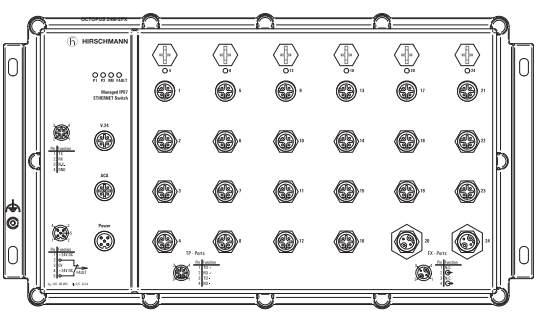
OCTOPUS 16M
OCTOPUS 16M Train
OCTOPUS 16M-8PoE



OCTOPUS 16M-2FX
OCTOPUS 16M-8PoE-2FX



OCTOPUS 24M
OCTOPUS 24M Train



OCTOPUS 24M-2FX

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You can get the latest version of this manual on the Internet at the Hirschmann product site (www.hirschmann-ac.de).

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Safety instructions

This documentation contains instructions which must be observed to ensure your own personal safety and to avoid damage to devices and machinery.

Certified usage

Please observe the following: The device may only be employed for the purposes described in the catalog and technical description, and only in conjunction with external devices and components recommended or approved by the manufacturer. The product can only be operated correctly and safely if it is transported, stored, installed and assembled properly and correctly. Furthermore, it must be operated and serviced carefully.

Supply voltage

For safety reasons the devices have been designed to operate at low voltages. Thus, they may only be connected to the supply voltage connections and to the signal contact with SELV circuits with the voltage restrictions in accordance with IEC/EN 60950-1.
The supply voltage is electrically isolated from the housing.

- ☐ Use only undamaged parts.
- ☐ Relevant for North America: For use in Class 2 circuits.
  The device may only be connected to a supply voltage of class 2 that fulfills the requirements of the National Electrical Code, Table 11(b). If the voltage is being supplied redundantly (two different voltage sources), the combined supply voltages must fulfill the requirements of the National Electrical Code, Table 11(b).
- ☐ Relevant for North America: For use in Class 2 circuits.
  Only use copper wire/conductors of class 1, 75 °C.
- ☐ Relevant for North America
  for devices certified for hazardous locations:
  Power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods [Article 501-4(b) of the National Electrical Code, NFPA 70] and in accordance with the authority having jurisdiction.

Shielding ground

Note: The shielding ground of the connectable twisted pair lines is connected to the housing as a conductor.

- ☐ Beware of possible short circuits when connecting a cable section with conductive shielding braiding.

Housing

Only technicians authorized by Hirschmann are permitted to open the housing.

The device is grounded via the separate ground screw.

☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.

Warning!
HOT SURFACE -
RISK OF BURNING!

Environment

The device may only be operated at the specified ambient temperature (temperature of the ambient air at a distance of up to 5 cm (1.97 in) from the device) and relative air humidity.

☐ Install the device in a location where the climatic threshold values specified in the technical data are adhered to. Make sure the environment does not heat the device. It can be mounted on temperature-isolating material.

☐ Only to be used in an environment with the contamination level specified in the technical data.

Qualification requirements for personnel

Qualified personnel as understood in this manual and the warning signs, are persons who are familiar with the setup, assembly, startup, and operation of this product and are appropriately qualified for their job. This includes, for example, those persons who have been:

- trained or directed or authorized to switch on and off, to ground and to label power circuits and devices or systems in accordance with current safety engineering standards;
- trained or directed in the care and use of appropriate safety equipment in accordance with the current standards of safety engineering;
- trained in providing first aid.

General safety instructions

Please note that products recommended as accessories may have characteristics that do not fully correspond to those of the corresponding product. This may limit their possible usage in the overall system.

Electricity is used to operate this equipment. Comply in every detail with the safety requirements specified in the operating instructions regarding the voltages to apply (see page 4).

Non-observance of these safety instructions can therefore cause material damage and/or serious injuries.

- ☐ Only appropriately qualified personnel should work on this device or in its vicinity. These personnel must be thoroughly familiar with all the warnings and maintenance procedures in accordance with this operating manual.
- ☐ The proper and safe operation of this device depends on proper handling during transport, proper storage and assembly, and conscientious operation and maintenance procedures.
- ☐ Never start operation with damaged components.
- ☐ Only use the devices in accordance with this manual. In particular, observe all warnings and safety-related information.
- ☐ Any work that may be required on the electrical installation may only be carried out by personnel trained for this purpose.

Relevant for OCTOPUS 16M-2FX, OCTOPUS 16M-8PoE-2FX, OCTOPUS 24M-2FX:

Note: LED or LASER components in compliance with IEC 60825-1 (2001):
CLASS 1 LASER PRODUCT
CLASS 1 LED PRODUCT

National and international safety regulations

- ☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.

Note on the CE marking

The devices comply with the regulations contained in the following European directive(s):

2004/108/EG
Directive of the European Parliament and the council for standardizing the regulations of member states with regard to electromagnetic compatibility.

72/245/EWG, 2009/19/EG
Guideline for standardizing the regulations of member states relating to radio interference from motor vehicles. Certified devices are marked with an e1 type approval indicator.
Relevant for OCTOPUS 8M-8PoE, OCTOPUS 8M-6PoE, OCTOPUS 16M-8PoE, OCTOPUS 16M-8PoE-2FX:
For use in connection with a suitable type approved power supply only.

In accordance with the above-named EU directive(s), the EU conformity declaration will be at the disposal of the relevant authorities at the following address:

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The product can be used in living areas (living area, place of business, small business) and in industrial areas.

- Interference immunity: EN 61000-6-2:2005
- Emitted interference: EN 55022:2006 + A1:2007 Class A

Warning!
This is a class A device. This device can cause interference in living areas, and in this case the operator may be required to take appropriate measures.
The assembly guidelines provided in these instructions must be strictly adhered to in order to observe the EMC threshold values.

FCC note:

Appropriate testing has established that this device fulfills the requirements of a class A digital device in line with part 15 of the FCC regulations.
These requirements are designed to provide sufficient protection against interference when the device is being used in a business environment. The device creates and uses high frequencies and can radiate same, and if it is not installed and used in accordance with this operating manual, it can cause radio transmission interference. The use of this device in a living area can also cause interference, and in this case the user is obliged to cover the costs of removing the interference.

Recycling note

After usage, this product must be disposed of properly as electronic waste in accordance with the current disposal regulations of your county / state / country.

About this manual

The following manuals are included as PDF files on the enclosed CD ROM:

- User manual “Installation”
- User manual “Basic configuration”
- User manual “Redundancy configuration”
- Reference manual “Web-based Interface” and
- Reference manual “Command Line Interface”

The Network Management Software HiVision/Industrial HiVision provides you with additional options for smooth configuration and monitoring:

- Configuration of multiple devices simultaneously.
- Graphical interface with network layouts.
- Auto-topology discovery.
- Event log.
- Event handling.
- Client / Server structure.
- Browser interface
- ActiveX control for SCADA integration
- SNMP/OPC gateway

Legend

The symbols used in this manual have the following meanings:

▶	Listing
☐	Work step
■	Subheading

1 Device description

The OCTOPUS devices are designed for the special requirements of industrial automation. They meet the relevant industry standards, provide very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility. The devices operate without fans and have a redundant voltage supply.

The HIPER-Ring redundancy concept enables you to quickly carry out a reconfiguration, and also a simple configuration with only one additional connection. It can be easily managed via a Web browser, via Telnet, with a management software product (such as HiVision) or locally on the switch (V.24 interface).

The devices allow you to set up switched industrial ETHERNET networks that conform to the IEEE 802.3 and 802.3u standards using copper wires or optical fibers in a line or ring structure. You can connect terminal devices and other infrastructure components via twisted pair cables and F/O. The twisted pair ports support autocrossing, autonegotiation and autopolarity.

Depending on the software you choose, the devices provide you with a large range of functions:

- Redundancy functions
  (Rapid Spanning Tree, Redundant Ring Structure, HIPER-Ring, Redundant Coupling, Link Aggregation, Redundant Power Supply)
- Protection from unauthorized access
- Synchronized system time in the network
- Network load control
- Operation diagnosis
- Diagnostics (hardware self-testing)
- Reset
- Priority
- VLAN
- Topology Discovery
- Web-based Interface
- Command Line Interface CLI
- SNMP
- 802.1x port authentication
- Real Time Clock

The addition, to the OCTOPUS range, of the Open Rail range, the MICE range, the MACH range of backbone switches, the BAT wireless transmission system, the EAGLE security system, and products for the LION control room, provides continuous communication across all levels of the company.

1.1 Description of the device variants

1.1.1 Devices without Power over Ethernet

The following device variants provide 8 to 24 10BASE-T/100BASE-TX ports (RJ45 connections) for connecting network segments or terminal devices:

- OCTOPUS 8M, OCTOPUS 8M Train
- OCTOPUS 16M, OCTOPUS 16M Train
- OCTOPUS 16M-2FX
- OCTOPUS 24M, OCTOPUS 24M Train
- OCTOPUS 24M-2FX

The OCTOPUS 8M Train, OCTOPUS 16M Train and OCTOPUS 24M Train devices are certified for railway applications - electronic systems in railway vehicles in accordance with EN 50155.

Device	Number of FX Ports	Number of TX Ports
OCTOPUS 8M, OCTOPUS 8M Train	-	8
OCTOPUS 16M, OCTOPUS 16M Train	-	16
OCTOPUS 16M-2FX	2	16
OCTOPUS 24M, OCTOPUS 24M Train	-	24
OCTOPUS 24M-2FX	2	24

1.1.2 Devices with Power over Ethernet

The following device variants, i.e. OCTOPUS ...PoE..., support Power over ETHERNET (PoE) in accordance with IEEE 802.3af:

- OCTOPUS 8M-8PoE
- OCTOPUS 8M-6PoE
- OCTOPUS 16M-8PoE
- OCTOPUS 16M-8PoE-2FX

They allow the connection and remote supply of, for example, IP telephones (Voice over IP), webcams, sensors, printer servers and WLAN access points via 10BASE-T/100BASE-TX. With PoE, these terminal devices are powered by the twisted-pair cable.

Depending on the device variant, the OCTOPUS ...PoE... provides six to eight 10BASE-T/100BASE-TX ports for connecting network segments or PoE terminal devices (PD, Powered Device) for all IEEE802.3af classes up to a maximum power output of 15.4 W.

Device	Number of FX Ports	Number of TX Ports	PoE-capable TX Ports included
OCTOPUS 8M-8PoE	-	8	8 (port 1 to 8)
OCTOPUS 8M-6PoE	-	8	6 (port 1 to 3 and 5 to 7)
OCTOPUS 16M-8PoE	-	16	8 (port 1 to 8)
OCTOPUS 16M-8PoE-2FX	2	16	8 (port 1 to 8)

The current is supplied on wire pairs transmitting the signal; the individual ports are not electrically insulated from each other.
The following conditions are met in accordance with IEEE 802.3af:

- Endpoint PSE
- Alternative A

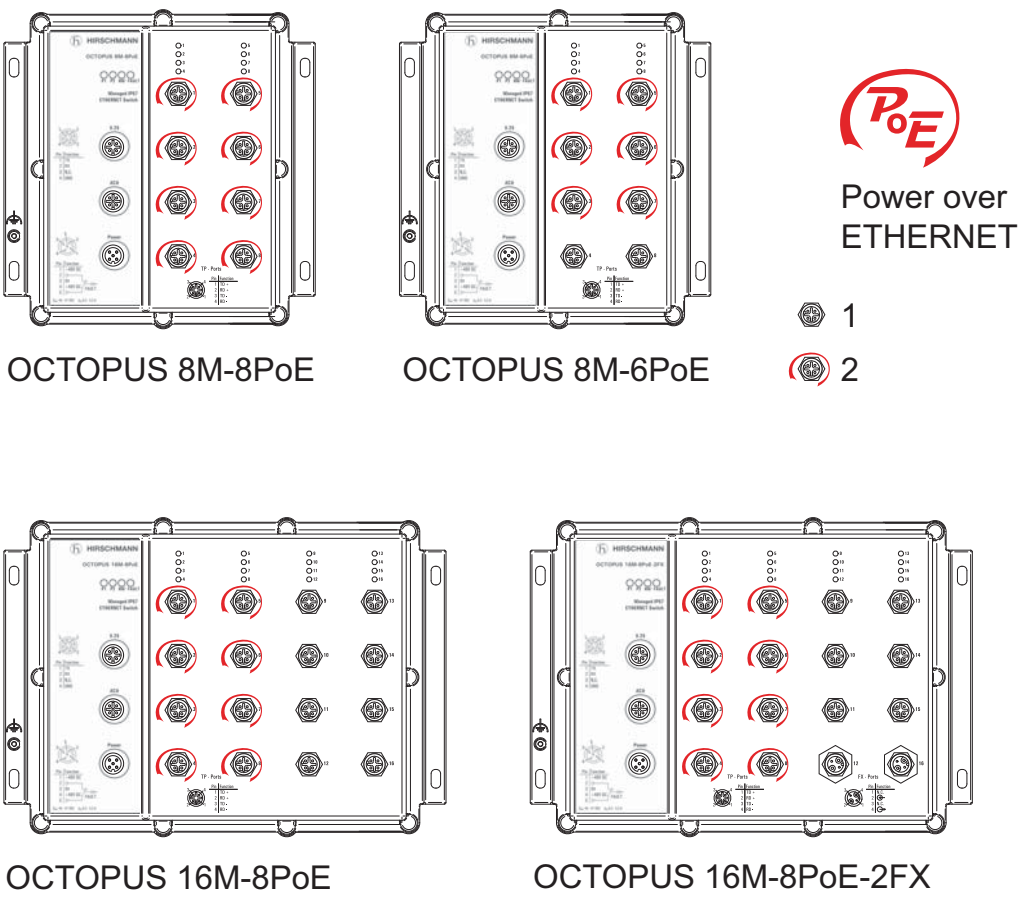


Figure 1: PoE-capable ports in the OCTOPUS ...PoE... devices
1 - port without PoE
2 - port with PoE

2 Assembly and start-up

The devices have been developed for practical application in a harsh industrial environment. The installation process is correspondingly simple.

On delivery, the device is ready for operation.
The following procedure has been proven to be successful for the assembly of the device:

- Unpacking and checking
- Connecting the plug for the supply voltage and the signal contact

- Installing the device and grounding
- Connecting the supply voltage, starting up
- Connecting the data lines

2.1 Installing the device

2.1.1 Unpacking and checking

☐ Check whether the contents of the package are complete (see page 28 „Scope of delivery“).
☐ Check the individual parts for transport damage.

2.1.2 Connecting the plug for supply voltage and signal contact

The supply voltage and the signal contact are connected by means of a 5-pin M12 connector (A coding, e.g.
ELWIKA 5012 PG7 from Hirschmann, included in the delivery).

■ Connecting the supply voltage
The supply voltage can be connected redundantly. Both inputs are uncoupled. There is no distributed load. With redundant supply, the power supply unit supplies the device alone with the higher output voltage. The supply voltage is electrically isolated from the housing.

Note: With non-redundant supply of the main voltage, the device reports a loss of power. You can avert this message by applying the supply voltage via both inputs, or by changing the configuration in the Management.

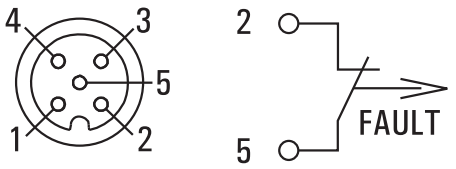
Figure	Pin	Function
	1	+ 24 V DC (1)
	2	Fault
	3	0 V DC
	4	+ 24 V DC (2)
	5	Fault

Table 1: Pin assignment of the 5-pin M12 connector for connecting the 24V supply voltage and the signal contact

Connecting the PoE supply voltage (optional)

The PoE supply voltage for OCTOPUS ...PoE... devices is connected via a 5-pin M12 connector (A coding, e.g. ELWIKA 5012 PG7 from Hirschmann, included in the delivery).

The OCTOPUS ...PoE... devices are supplied with PoE voltage (48 V DC safety low voltage) via an external power supply unit. The PoE voltage is fed into the 5-pin M12 connector of the OCTOPUS ...PoE... The twisted-pair cables at ports 1 to 8 (or 1 to 6 for the OCTOPUS 8M-6PoE) are supplied with PoE voltage via pins 1 and 4 to the wire pairs transmitting the signal (phantom voltage).

☐ Make sure that the external power supply unit you use to provide the PoE voltage fulfills the following basic prerequisites:
- Insulation requirements according to IEEE 802.3af (insulation resistance 48 V, output to “rest of the world” 2,250 V DC for 1 min.).
- Output power < 150 W
- Current limitation < 5 A
- Power supply unit and PoE media module form a “limited power source” according to IEC 60950-1.
- The external PoE power supply unit must be able to provide the power for the connected PDs.
- 10 ms failure bridging (incl. Powered Devices) in accordance with EN 61131-2
- CE marking in accordance with 2004/108/EG
- Certified for railway applications - electronic systems in railway vehicles in accordance with EN 50155

☐ Connect the PoE voltage to the 5-pin M12 connector included in the scope of delivery as shown in the following diagram.
Make sure the the following requirements are met:
- Supply line length < 3 m
- Supply line cross section is suitable for 3.3 A.

Note: Do not operate the OCTOPUS ...PoE... devices in series. Only connect single external power supply units directly to an OCTOPUS ...PoE... device.

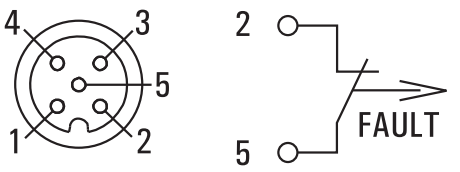
Figure	Pin	Function
	1	+ 48 V DC (1)
	2	Fault
	3	0 V DC
	4	+ 48 V DC (2)
	5	Fault

Table 2: Pin assignment of the 5-pin M12 connector for connecting the PoE supply voltage and the signal contact

„FAULT“ signal contact

- The signal contact (“FAULT”, for pin assignment see table 1) is used for the remote monitoring of the device to enable remote diagnostics. You can specify the type of function monitoring in the Management.
- You can also use the Management to set the signal contact manually and thus control external devices.

A break in contact is used to report the following conditions via the potential-free signal contact (relay contact, closed circuit):

- The failure of at least one supply voltage.
- A continuous malfunction in the device.
- The loss of connection at at least one port. The report of the link status can be masked by the Management for each port. In the delivery state, link status monitoring is deactivated.
- The loss of ring redundancy reserve.
- A detected error during the self-test.
- Incorrect configuration of the HIPER-Ring or ring coupling.

The following condition is also reported in RM mode:

- Ring redundancy reserve is available. On delivery, there is no ring redundancy monitoring.

☐ Connecting the supply voltage and signal lines.

2.1.3 Installing the device and grounding

Installing the device

To protect the exposed contacts of the components still to be installed from dirt, connect the individual system components in a dry and clean working area. Seal unused ports with the protection caps supplied.

Note: Connectors are not electrical isolating devices. Therefore, first plug the connector into the power supply plug and then switch on the power supply.

- ☐ Install the device in a location where the climatic threshold values specified in the technical data are adhered to.
  Make sure the environment does not heat the device. It can be mounted on temperature-isolating material.
- ☐ Prepare the drill holes at the installation point.
- ☐ Mount the device on a level surface with four M5 screws.

Note:

- ▶ Protection class IP67 is only achieved when the device is screwed on.
- ▶ Protection class IP67 is only achieved when all the components connected fulfill protection type IP67.

- ☐ Cover unused connections with the cover caps supplied.
- ☐ Only connect plugs and other components that fulfill protection class IP67 and that are certified for a temperate range from -40 °C to +70 °C.

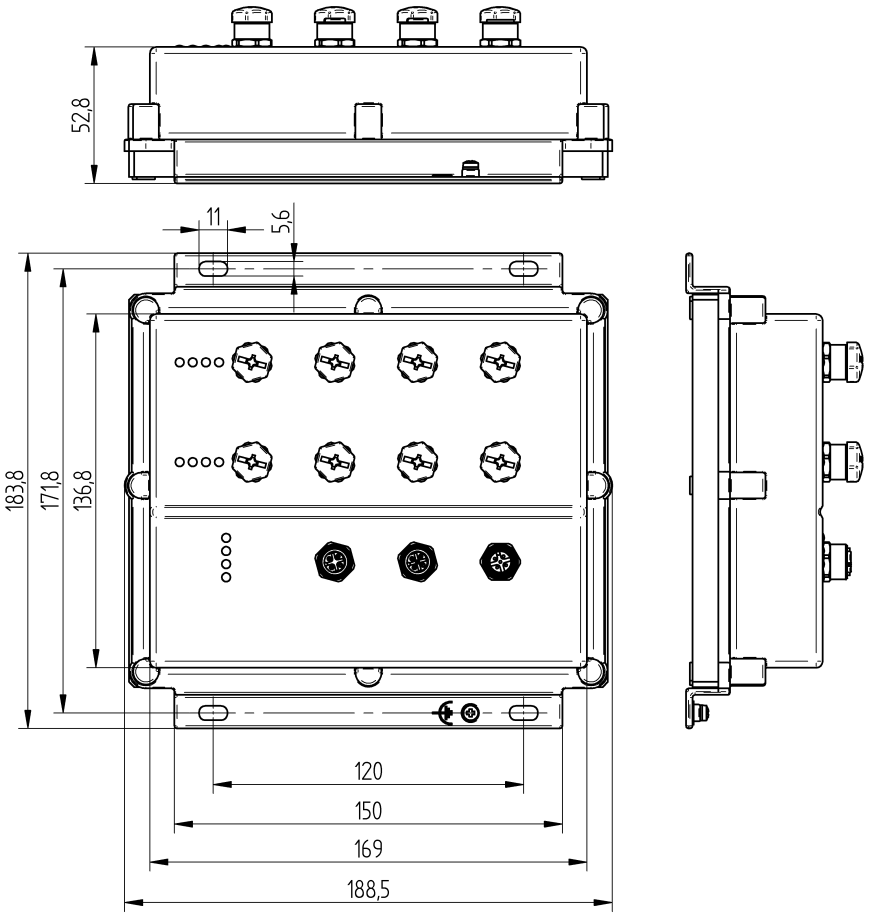


Figure 2: Dimensions of OCTOPUS 8M, OCTOPUS 8M Train, OCTOPUS 8M-8PoE, OCTOPUS 8M-6PoE

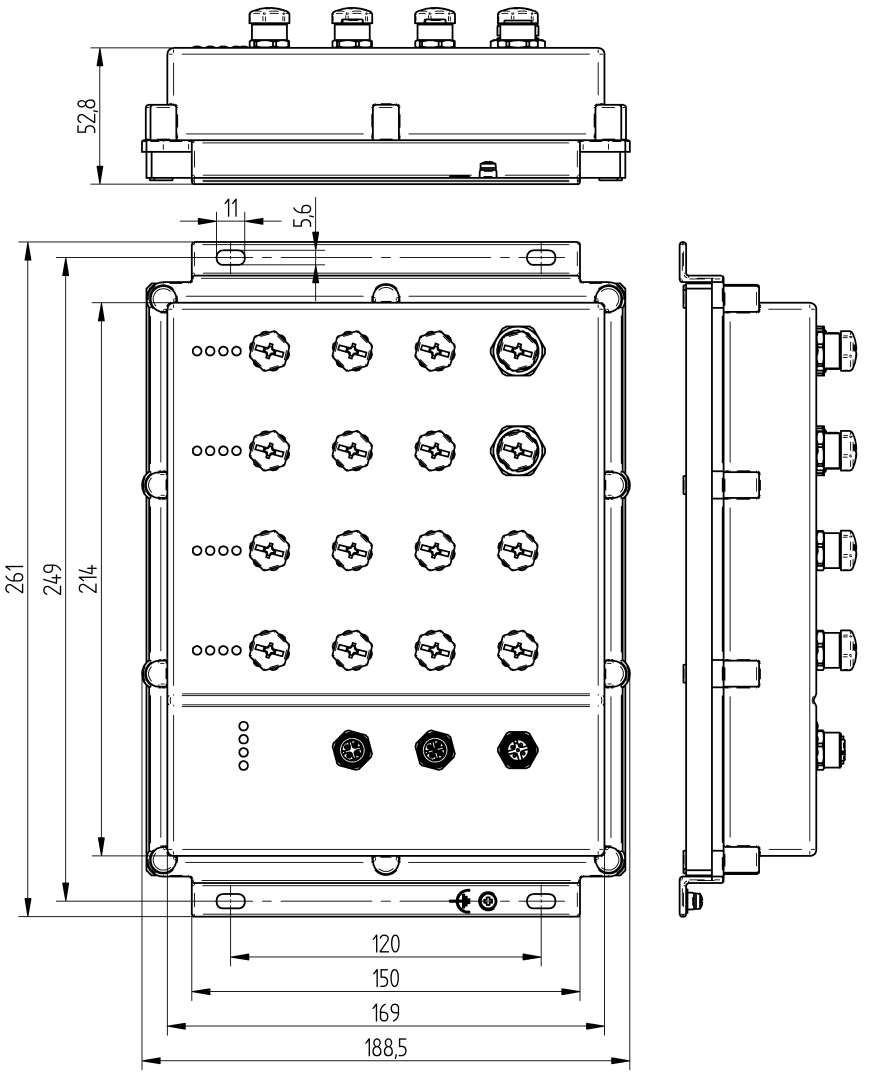


Figure 3: Dimensions of OCTOPUS 16M, OCTOPUS 16M Train, OCTOPUS 16M-2FX, OCTOPUS 16M-8PoE, OCTOPUS 16M-8PoE-2FX

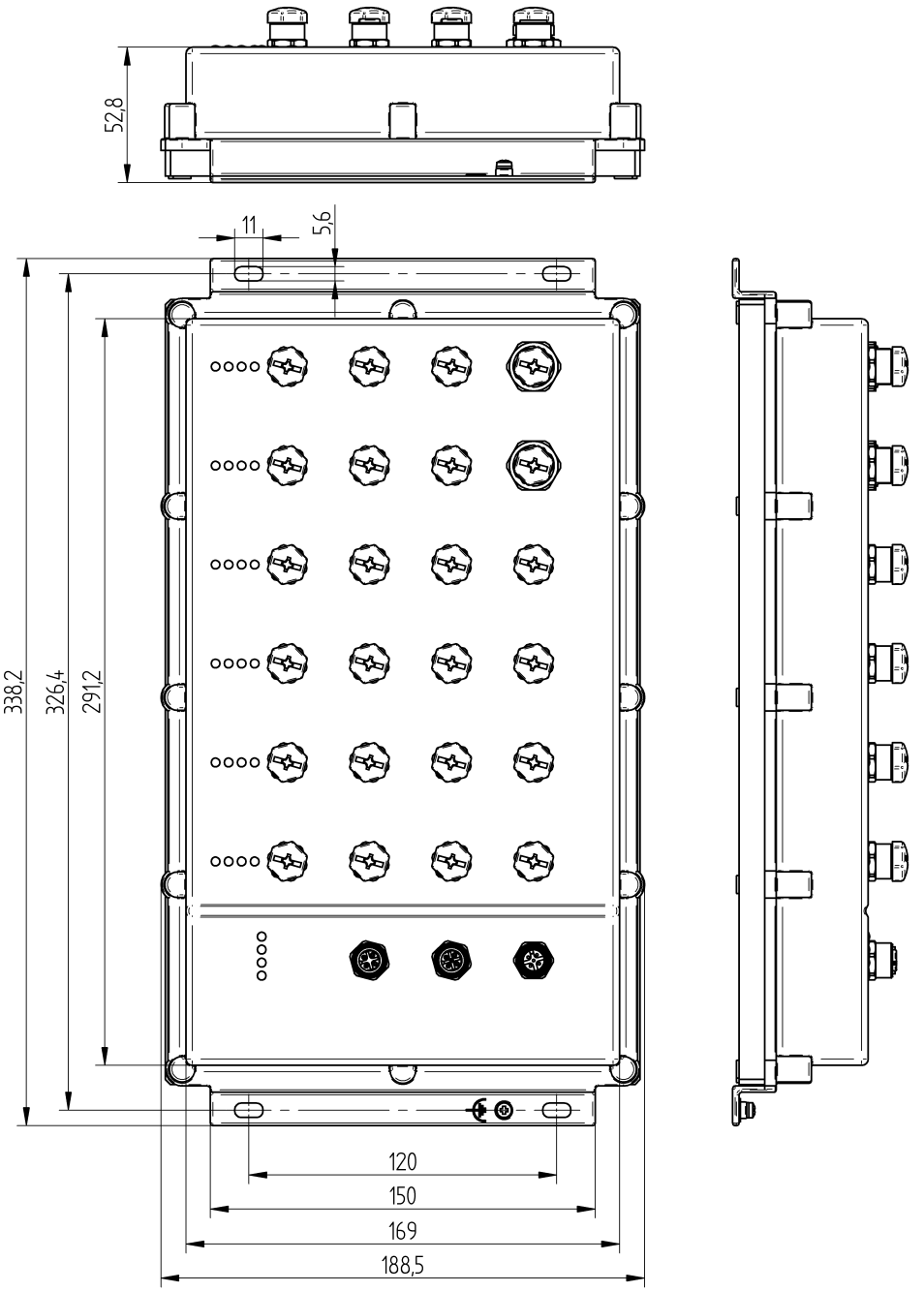


Figure 4: Dimensions of OCTOPUS 24M, OCTOPUS 24M Train, OCTOPUS 24M-2FX

Grounding the device

The device is grounded via the separate grounding nuts (M3).

☐ Use toothed washers to ensure good electrical conductivity at the connection.

Note: The shielding ground of the connectable twisted pair lines is connected to the housing as a conductor.

2.1.4 Connecting the supply voltage, starting up

☐ Mount the connector for the supply voltage and the signal contact on the front of the device.

When you connect the supply voltage, you start up the device.

2.1.5 Connecting the data lines

You can connect terminal devices and other segments at the ports of the device via twisted pair cables.

■ 10/100 Mbit/s twisted pair connection

10/100 Mbit/s ports enable the connection of terminal devices or independent network segments according to the IEEE 802.3 100BASE-TX / 10BASE-T standard.

These ports support:

- Autonegotiation
- Autopolarity
- Autocrossing (if autonegotiation is activated)
- 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode

State on delivery: autonegotiation activated.

The socket housing is electrically connected to the housing.

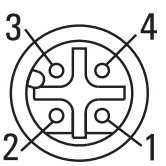
Figure	Pin	Function
	1	TD+ Transmit Data +
	2	RD+ Receive Data +
	3	TD- Transmit Data -
	4	RD- Receive Data -
	Housing: shield	

Table 3: Pin assignment of a TP/TX interface (M12 socket)

☐ Install the data lines according to your requirements.
☐ Use a shielded CAT5 cable.
☐ Use a shielded 4-pin M12 plug.
☐ Connect the cable shield to the connector housing.

■ 10/100 Mbit/s twisted pair connection (OCTOPUS-...PoE...)

10/100 Mbit/s ports (M12 connector) enable the connection of terminal devices or independent network segments according to the IEEE 802.3 100BASE-TX / 10BASE-T and IEEE 802.3af (Power over ETHERNET on data lines) standards.

These ports support:

- Autonegotiation
- Autopolarity
- Autocrossing (if autonegotiation is activated)

- 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode
- Power over ETHERNET (PoE)

State on delivery: autonegotiation activated.
The socket housing is electrically connected to the housing.
The PoE voltage is input via pins 1 and 4 to the wire pairs transmitting the signal (phantom voltage).

Figure	Pin	Color	Function	PoE(PSE)
	1	White and orange	TX+ Transmit Data +	+
	2	White and green	RX+ Receive Data +	-
	3	Orange	TX- Transmit Data -	+
	4	Green	RX- Receive Data -	-
	Housing: shield			

Table 4: Pin assignment of the TP/TX interface for PoE for the voltage supply to the wire pairs transmitting the signal (M12 socket)

- ☐ Install the data lines according to your requirements.
- ☐ Use a shielded CAT5 cable.
- ☐ Use a shielded 4-pin M12 plug.
- ☐ Connect the cable shield to the connector housing.

The patch cables for operating the device are shown in the following figure.

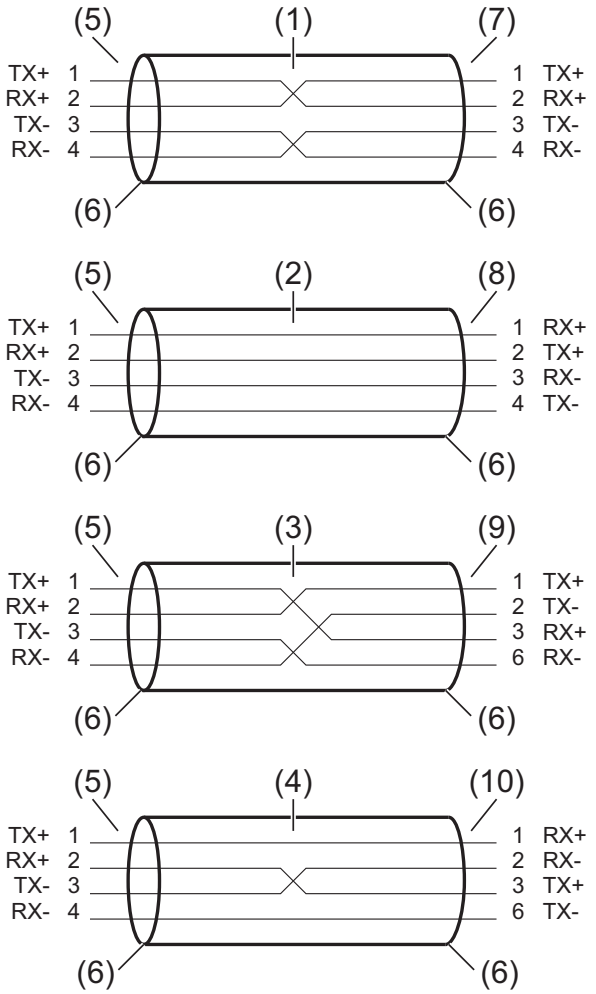


Figure 5: Patch cables for operating the device
(1) - Connection cables M12-4 on M12-4, crossed
(2) - Connection cables M12-4 on M12-4, 1 to 1
(3) - Connection cables M12-4 on RJ45, crossed
(4) - Connection cables M12-4 on RJ45, 1 to 1
(5) - M12 (MDI)
(6) - Shield
(7) - M12 (MDI)
(8) - M12 (MDI-X via autocrossing port)
(9) - RJ45, MDI (terminal device)
(10) - RJ45, MDI-X (Switch)

100 Mbit/s F/O connection (MicroFX)

100 MBit/s LWL ports enable the connection of terminal devices or independent network segments in compliance with the IEEE 802.3 100BASE-FX standard. These ports support:

- Full duplex mode

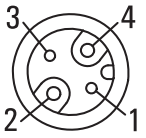
Figure	Pin	Function	
	1	N.C.	Not used
	2	RX	Receive Data
	3	N.C.	Not used
	4	TX	Transmit Data

Table 5: Pin assignment of the MicroFX socket

2.2 Display elements

After the operating voltage is set up, the software starts and initializes itself. Afterwards, the device performs a self-test. During this process, various LEDs light up. The process takes around 60 seconds.

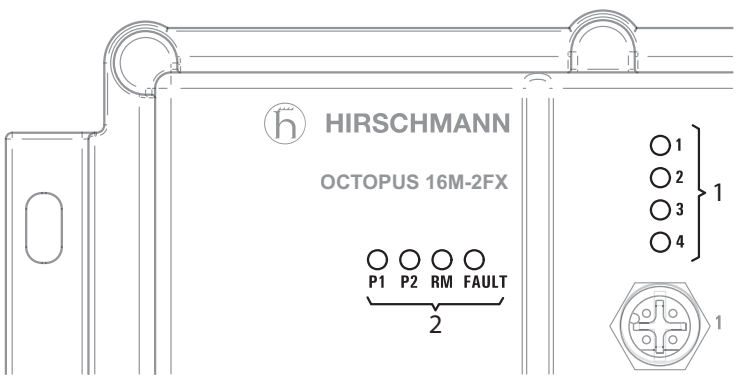


Figure 6: Display elements
1 - Port status LEDs (here: for ports 1 to 4)
2 - Device status LEDs

Device state

These LEDs provide information about conditions which affect the operation of the whole device.

P1 - Power 1 (green LED)	
Glowing green	Supply voltage 1 is present
Not glowing	Supply voltage 1 is too low
P2 - Power 2 (green LED)	
Glowing green	Supply voltage 2 is present
Not glowing	Supply voltage 2 is too low
FAULT - error, signal contact (red LED) [a]	
Glowing red	The signal contact is open, i.e. it is reporting an error.
Not glowing	The signal contact is closed, i.e. it is not reporting an error.

a. If the manual adjustment is active on the “FAULT” signal contact, then the detected error display is independent of the setting of the signal contact.

RM - Ring Manager (green/yellow LED)	
Glowing green	RM function active, redundant port disabled
Glowing yellow	RM function active, redundant port enabled
Not glowing	RM function not active
Flashing green	Incorrect configuration of the HIPER-Ring (e.g. the ring is not connected to the ring port).

Port state

These LED's display port-related information. During the boot phase, these LED's are used to display the status of the boot procedure.

LS - data, link status (one green/yellow LED per port)	
Not glowing	No valid connection.
Glowing green	Valid connection.
Flashing green (1 time a period)	Port is switched to stand-by.
Flashing green (3 times a period)	Port is switched off.
Flashing yellow	Data reception.

Note: You can query the port status for activated Power over Ethernet via the software management.

2.3 Basic set-up

The IP parameters must be entered when the device is installed for the first time. The device provides 6 options for configuring IP addresses:

- Entry via V.24 connection
- Entry using the HiDiscovery protocol
- Configuration via BOOTP
- Configuration via DHCP
- Configuration via DHCP Option 82
- Auto Configuration Adapter

Further information on the basic settings of the device can be found in the "Basic Configuration" user manual on the CD ROM.

Default settings

- IP address: The device looks for the IP address using DHCP
- Password for management:
  Login: user; password: public (read only)
  Login: admin; password: private (read and write)
- Parameters that can be set via the management are set to pre-defined values in accordance with the MIB
- V.24 data rate: 9,600 Baud

- Ring redundancy: deactivated
- Ethernet ports: link status is not evaluated (signal contact)
- Optical 100 Mbit/s ports: 100 Mbit/s, full duplex
  All other ports: autonegotiation
- Ring manager disabled

USB Interface (ACA21-M12)

The USB socket has an interface for the local connection of an AutoConfiguration Adapter ACA 21-M12. It is used for saving/loading the configuration and diagnostic functions, and for loading the software.
The USB interface is a shielded 5-pin M12 socket with A coding.

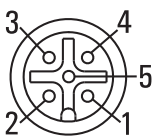
Figure	Pin	Function	
	1	U_{in}	USB 5 V
	2	N.C.	Not used
	3	D-	Data -
	4	GND	Ground (0 V)
	5	D+	Data +

Table 6: Pin assignment of the ACA21-12 (M12 socket)

Note: Available as an accessory for certain Hirschmann devices, the AutoConfiguration Adapter ACA11-M12 is not designed to be used with OCTOPUS devices.
Use the ACA21-M12 if you want to use an AutoConfiguration Adapter for your OCTOPUS device (USB socket of the OCTOPUS device, see table 6).

V.24 interface (external management)

At the V.24 connection, a serial interface is provided for the local connection of an external management station (VT100 terminal or PC with corresponding terminal emulation). This enables you to set up a connection to the Command Line Interface (CLI) and to the system monitor.

VT 100 terminal settings	
Speed	9,600 Baud
Data	8 bit
Stopbit	1 bit
Handshake	off
Parity	none

The socket housing is electrically connected to the housing of the device.
The V.24 interface is not electrically isolated from the supply voltage.

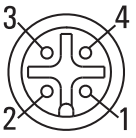
Figure	Pin		Function
	1	TX.	Transmit Data
	2	RX	Receive Data
	3	N.C.	Not used
	4	GND	Ground (0 V)

Table 7: Pin assignment of the V.24 interface (M12 socket)

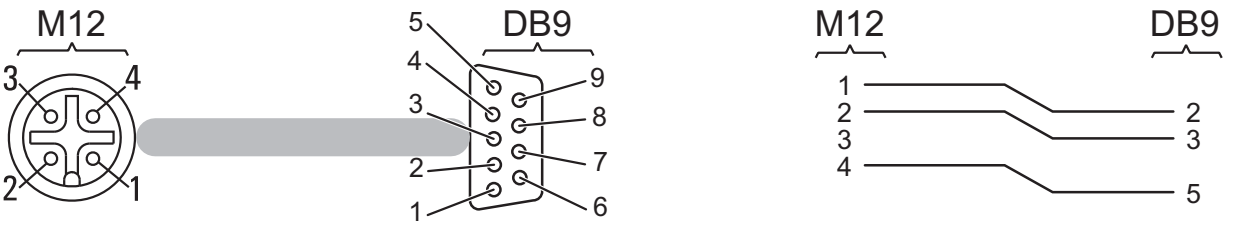


Figure 7: Terminal cable for connecting an external Management Station

Note: You will find the order number for the terminal cable, which is ordered separately, in the Technical Data chapter (see on page 26 „Technical data“).

Note: Available as an accessory for certain Hirschmann devices, the AutoConfiguration Adapter ACA11-M12 is not designed to be used with OCTOPUS devices.
Use the ACA21-M12 if you want to use an AutoConfiguration Adapter for your OCTOPUS device (USB socket of the OCTOPUS device, see table 6).

You will find a description of the V.24 interface in the “Basic Configuration User Manual” on the CD-ROM.

3 Technical data

General technical data

Dimensions W x D x H	OCTOPUS 8M... OCTOPUS 16M... OCTOPUS 24M...	189 mm x 184 mm x 70 mm 189 mm x 261 mm x 70 mm 189 mm x 338 mm x 70 mm
Weight	OCTOPUS 8M OCTOPUS 8M Train OCTOPUS 8M-8PoE OCTOPUS 8M-6PoE OCTOPUS 16M OCTOPUS 16M Train OCTOPUS 16M-8PoE OCTOPUS 16M-2FX OCTOPUS 16M-8PoE-2FX OCTOPUS 24M OCTOPUS 24M Train OCTOPUS 24M-2FX	1,310 g 1,920 g 1,950 g 2,540 g 2,570 g
Power supply	Operating voltage OCTOPUS ... (without PoE) OCTOPUS ...PoE...	Safety extra-low voltage (SELV/ PELV) redundant inputs disconnected. Relevant for North America: Nec Class 2 power source max. 5A. 9.6 to 60 V DC 46 to 58 V DC
Overload current protection at input		Non-replaceable fuse
Insulation voltage between operating voltage connections and housing	OCTOPUS ... (without PoE or Train) OCTOPUS ... Train OCTOPUS ...PoE...	800 V DC Protective elements limit the insulation voltage to 90 V DC (1mA) 707 V DC 2,250 V DC
“FAULT” signal contact	Switching current Switching voltage	max. 1 A, SELV max. 60 V DC or max. 30 V AC, SELV
Environment	Storage temperature (ambient air temperature) Humidity Atmospheric pressure	-40 °C to +85 °C 0% to 95% (non-condensing) Up to 2000 m (795 hPa), higher altitudes on request
Operating temperature	OCTOPUS...	Ambient air -40 °C to +70 °C
Protection classes	Protection class	IP 67

EMC and immunity

EMC interference immunity		
IEC/EN 61000-4-2	Electrostatic discharge	
	Contact discharge	6 kV
	Air discharge	8 kV
IEC/EN 61000-4-3	Electromagnetic field	
	80 - 2,700 MHz	20 V/m
IEC/EN 61000-4-4	Fast transients (burst)	
	Power line	4 kV
	Data line	4 kV
IEC/EN 61000-4-5	Voltage surges	
	Power line	1 kV line / line
	Power line	2 kV line / earth
	Data line	1kV
IEC/EN 61000-4-6	Line-conducted interference voltages 150 kHz - 80 MHz	10 V
EN 61000-4-9	Impulse-shaped magnetic fields (only OCTOPUS... Train)	300 A/m

EMC emitted interference		
EN 55022	Class A	Yes
FCC 47 CFR Part 15	Class A	Yes
German Lloyd	Classification + Construction Guidelines VI-7-3 Part 1 Ed.2001	Yes
Stability		
Vibration	IEC 60068-2-6 Test FC test level according to IEC 61131-2	Yes
	Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1	Yes
	IEC 870-2-2 table 3 normal installation according to EN 61850-3	Yes
	EN 61373, Category 1, Class A (broadband noise), installation in acc. with EN 50155	Yes
Shock	IEC 60068-2-27 Test Ea test level according to IEC 61131-2	Yes
	IEC 870-2-2 table 3 normal installation according to EN 61850-3	Yes
	EN 61373, Category 1, Class A (broadband noise), installation in acc. with EN 50155	Yes

Network range

TP port	
Length of a twisted pair segment	typ. 100 m (cat5e cable with 100BASE-TX)

Table 8: TP port 10BASE-T / 100BASE-TX

Connec-tion		Wave-length	Fiber	System attenua-tion	Expansion	Fiber data
MicroFX	MM	1300 nm	50/125 µm	0-8 dB	0-5 km	1.0 dB/km, 800 MHz*km
MircoFX	MM	1300 nm	62.5/125 µm	0-11 dB	0-4 km	1.0 dB/km, 500 MHz*km

Table 9: F/O port 100BASE-FX

MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

Power consumption/power output

Name		Maximum power con-sumption	Power output
OCTOPUS 8M		6.2 W	21.1 Btu (IT)/h
OCTOPUS 8M Train		6.2 W	21.1 Btu (IT)/h
OCTOPUS 8M-8PoE	non-PD (powered device) 8 x Class0-PD	10.0 W 142.0 W	34.0 Btu (IT)/h 483.3 Btu (IT)/h
OCTOPUS 8M-6PoE	non-PD (powered device) 6 x Class0-PD	10.0 W 110.0 W	34.0 Btu (IT)/h 374.4 Btu (IT)/h
OCTOPUS 16M		9.5 W	32.4 Btu (IT)/h
OCTOPUS 16M Train		9.5 W	32.4 Btu (IT)/h
OCTOPUS 16M-8PoE	non-PD (powered device) 8 x Class0-PD	13.5 W 145.0 W	45.9 Btu (IT)/h 493.5 Btu (IT)/h
OCTOPUS 16M-2FX		13.0 W	44.4 Btu (IT)/h
OCTOPUS 16M-8PoE-2FX	non-PD (powered device) 8 x Class0-PD	17.0 W 150.0 W	57.9 Btu (IT)/h 510.5 Btu (IT)/h
OCTOPUS 24M		13.5 W	46.0 Btu (IT)/h
OCTOPUS 24M Train		13.5 W	46.0 Btu (IT)/h
OCTOPUS 24M-2FX		14.9 W	50.9 Btu (IT)/h

Scope of delivery

Note: The cable socket ELWIKA 5012 PG7 (933 175-100) included in the delivery supports a temperature range from -25 °C to +70 °C. It can thus restrict the possible range of usage for the overall system. You can obtain special sockets with protection class IP67 and an extended temperature range on request.

Device	Scope of delivery
OCTOPUS 8M OCTOPUS 8M Train OCTOPUS 8M-8PoE OCTOPUS 8M-6PoE OCTOPUS 16M OCTOPUS 16M Train OCTOPUS 16M-8PoE OCTOPUS 16M-2FX OCTOPUS 16M-8PoE-2FX OCTOPUS 24M OCTOPUS 24M Train OCTOPUS 24M-2FX	- OCTOPUS ... device - Cable socket ELWIKA 5012 PG7 for supply voltage and signal contact - 9 (for OCTOPUS 8M...), 17 (for OCTOPUS 16M...) and 25 (for OCTOPUS 24M...) protective caps for sealing unused ports - Installation user manual and CD-ROM

Order numbers/product description

Device	Order number
OCTOPUS 8M	943 931-001
OCTOPUS 8M Train	943 983-001
OCTOPUS 8M-8PoE	943 967-001
OCTOPUS 8M-6PoE	943 967-101
OCTOPUS 16M	943 912-001
OCTOPUS 16M Train	943 984-001
OCTOPUS 16M-8PoE	943 960-001
OCTOPUS 16M-2FX	943 912-002
OCTOPUS 16M-8PoE-2FX	943 960-101
OCTOPUS 24M	943 923-001
OCTOPUS 24M Train	943 985-001
OCTOPUS 24M-2FX	943 923-002

Accessories

Note: Some products recommended as accessories do not support the entire temperature range specified for the device. They can thus restrict the possible range of usage for the overall system. You can obtain special sockets with protection class IP67 and an extended temperature range on request. Unsealed accessory parts such as RJ45 adapters or terminal cables are not suitable for use within an IP67 area.

Name	Order number
Pocket Guide	280 710-851
AutoConfiguration Adapter ACA21-M12	943 913-001
Terminal cable	943 902-001
Cable socket ELWIKA 5012 PG7 (5-pin M12 socket for supply voltage and signal contact)	933 175-100
Field-attachable 5-pin M12 socket, A-coded with two cable outputs	RKC5/Duo
M12 connector, D-coded	934 445-001
Connection cable with M12 connector, D-coded	934 497-00x
Transition M12 D-coded to RJ45	934 498-001

Name	Order number
Industrial HiVision Network Management software	943 156-xxx
HiVision Network Management software	943 471-100
OPC Server software HiOPC	943 055-001

Underlying norms and standards

Name	
cUL 508:1998	Safety for Industrial Control Equipment
EN 50121-4:2006	Railway applications - EMC - emitted interference and interference immunity for signal and telecommunication systems
EN 50155:2007	Railway applications - electronic systems in railway vehicles
EN 55022:2006 + A1:2007	IT equipment – radio interference characteristics
EN 61000-6-2:2005	Generic norm – immunity in industrial environments
EN 61131-2:2007	Programmable logic controllers
FCC 47 CFR Part 15:2009	Code of Federal Regulations
Germanischer Lloyd	Ship Applications - Classification and Construction Guidelines VI-7-3 Part 1 Ed.2003
IEEE 802.1 D	Switching, GARP, GMRP, Spanning Tree
IEEE 802.1 D-1998	Media access control (MAC) bridges (includes IEEE 802.1p Priority and Dynamic Multicast Filtering, GARP, GMRP)
IEEE 802.1 Q	Tagging
IEEE 802.1 Q-1998	Virtual Bridged Local Area Networks (VLAN Tagging, GVRP)
IEEE 802.1 w.2001	Rapid Reconfiguration
IEEE 802.3-2002	Ethernet
RL 72/245/EWG, 2009/19/EG	e1 type certification for use in vehicles

Table 10: List of norms and standards. Certified devices are marked with a certification indicator. From the imprint on the device label you will see the current certification status of your device.

Certifications

Standard	OCTOPUS... (without PoE)	OCTOPUS...PoE	OCTOPUS...Train
cUL 508 / CSA C22.2 No.142	Yes	pending	No
German Lloyd	Yes	pending	No
e1 type certification	Yes	Yes	No
FCC 47 CFR Part 15:2009	Yes	Yes	Yes
EN 50155	No	pending	Yes
EN 50121-4:2006	No	No	Yes
EN 61131-2:2007	Yes	Yes	Yes

Table 11: Certifications - for the current status, visit www.hirschmann.com

A Further support

Technical questions and training courses

In the event of technical queries, please contact your local Hirschmann distributor or Hirschmann office.
You can find the addresses of our distributors on the Internet: www.hirschmann-ac.com.

Our support line is also at your disposal:

- Tel. +49 1805 14-1538
- Fax +49 7127 14-1551

Answers to Frequently Asked Questions can be found on the Hirschmann internet site (www.hirschmann-ac.com) at the end of the product sites in the FAQ category.
The current training courses to technology and products can be found under http://www.hicomcenter.com.

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